

PCT

**WORLD INTELLECTUAL PROPERTY ORGANIZATION**  
**International Bureau**



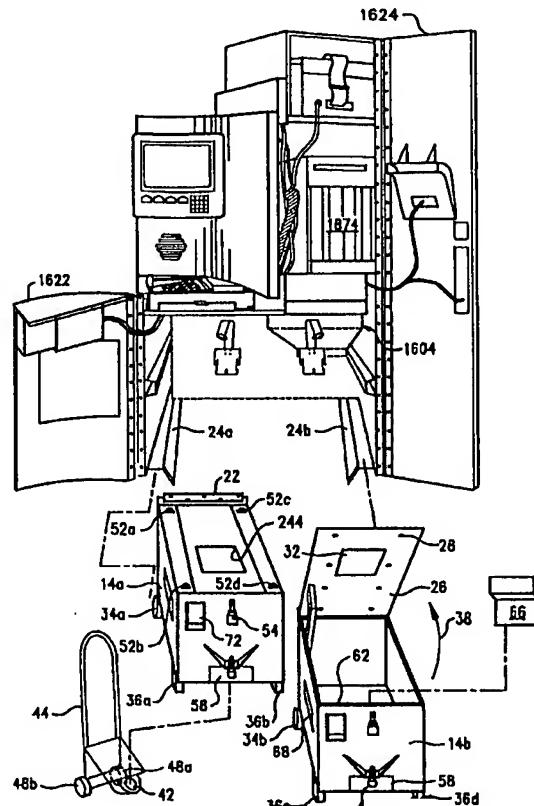
INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification <sup>6</sup> : <b>G07F 9/06</b>		<b>A1</b>	(11) International Publication Number: <b>WO 99/00776</b>
			(43) International Publication Date: <b>7 January 1999 (07.01.99)</b>
(21) International Application Number:	PCT/US98/13297		(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, GW, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).
(22) International Filing Date:	26 June 1998 (26.06.98)		
(30) Priority Data:	08/883,776	27 June 1997 (27.06.97)	US
(71) Applicant ( <i>for all designated States except US</i> ):	COINSTAR, INC. [US/US]; P.O. Box 91258, Bellevue, WA 98009 (US).		
(72) Inventors; and			Published
(75) Inventors/Applicants ( <i>for US only</i> ):	MARTIN, Doug [US/US]; 19525 N.E. 159th Street, Woodinville, WA 98272 (US). SCHERER, Scott [US/US]; 124 Warren Avenue N. #210, Seattle, WA 98109 (US). BORGmann, Russell [US/US]; 20130 S.E. 308th Street, Kent, WA 98042 (US).		<i>With international search report.</i>
(74) Agents:	HANSRA, Tejpal, S. et al.; Sheridan Ross P.C., Suite 3500, 1700 Lincoln Street, Denver, CO 80203-4501 (US).		

(54) Title: COIN BIN WITH LOCKING LID

### (57) Abstract

A bin (14a, 14b) for use in a coin handling device for receiving coins through an opening (32) in the bin is provided with a cover (212) movable from an open position to a closed position. The cover is configured to couple with a key (16a, 16b) mounted in the coin handling device such that when the bin is inserted into the coin handling device, the key automatically unlocks and opens the cover. When the bin is withdrawn from the coin handling device, the opening is automatically covered and the cover is automatically locked in the closed position.



***FOR THE PURPOSES OF INFORMATION ONLY***

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	ES	Spain	LS	Lesotho	SI	Slovenia
AM	Armenia	FI	Finland	LT	Lithuania	SK	Slovakia
AT	Austria	FR	France	LU	Luxembourg	SN	Senegal
AU	Australia	GA	Gabon	LV	Latvia	SZ	Swaziland
AZ	Azerbaijan	GB	United Kingdom	MC	Monaco	TD	Chad
BA	Bosnia and Herzegovina	GE	Georgia	MD	Republic of Moldova	TG	Togo
BB	Barbados	GH	Ghana	MG	Madagascar	TJ	Tajikistan
BE	Belgium	GN	Guinea	MK	The former Yugoslav	TM	Turkmenistan
BF	Burkina Faso	GR	Greece		Republic of Macedonia	TR	Turkey
BG	Bulgaria	HU	Hungary	ML	Mali	TT	Trinidad and Tobago
BJ	Benin	IE	Ireland	MN	Mongolia	UA	Ukraine
BR	Brazil	IL	Israel	MR	Mauritania	UG	Uganda
BY	Belarus	IS	Iceland	MW	Malawi	US	United States of America
CA	Canada	IT	Italy	MX	Mexico	UZ	Uzbekistan
CF	Central African Republic	JP	Japan	NE	Niger	VN	Viet Nam
CG	Congo	KE	Kenya	NL	Netherlands	YU	Yugoslavia
CH	Switzerland	KG	Kyrgyzstan	NO	Norway	ZW	Zimbabwe
CI	Côte d'Ivoire	KP	Democratic People's	NZ	New Zealand		
CM	Cameroon		Republic of Korea	PL	Poland		
CN	China	KR	Republic of Korea	PT	Portugal		
CU	Cuba	KZ	Kazakhstan	RO	Romania		
CZ	Czech Republic	LC	Saint Lucia	RU	Russian Federation		
DE	Germany	LI	Liechtenstein	SD	Sudan		
DK	Denmark	LK	Sri Lanka	SE	Sweden		
EE	Estonia	LR	Liberia	SG	Singapore		

**COIN BIN WITH LOCKING LID****FIELD OF THE INVENTION**

The present invention relates to a bin with a self-locking hatch and in particular to a bin usable with a coin counting device which is automatically opened and unlocked and positioned in the coin counting 5 device and is automatically closed and locked upon removal from the coin counting device.

**BACKGROUND OF THE INVENTION**

A number of coin counting or coin handling devices are configured to receive coins, or to work 10 in cooperation with a device for receiving coins, after they have been counted or handled. For example, the coin counting device may be configured to output counted coins to a tray, bin, box, bag, trolley or similar device. Some coin handling devices are configured to output coins to two or more difference receptacles, such as to place different coin denominations in different bags or to distribute coins to two or 15 more receptacles so as to avoid a single receptacle which is heavier than desired when loaded.

A number of coin handling devices are configured to facilitate removal of coins from the coin 20 handling device, e.g. for deposit in a bank, reuse elsewhere, further counting or other handling, sorting, and the like. Conveniently, coin handling devices may be configured to permit easy removal of a coin bin, bag or other receptacle after it has been fully or partially filled with coins. Such removal of a bin, bag or other coin receptacle presents a number of handling, security and other problems. Since the receptacle, during 25 use, has at least one opening through which coins are received, upon removal of the receptacle there is a potential for pilfering or other unauthorized removal of coins from the receptacle, and a potential for spillage or other unintentional loss of coins. In some situations, bins or bags may be configured so that personnel removing the receptacle may manually close the opening. However, since this procedure relies on the memory, diligence and honesty of the person removing the receptacle, there is a potential of personnel to forget or otherwise fail to properly close the receptacle, leading to loss of coins. In some cases, a receptacle 30 may be configured to permit an opening to be closed but may not provide for automatic locking of a receptacle, potentially permitting opening of a closed but unlocked receptacle. Accordingly, there is a need for a coin receptacle which, upon removal from a coin counting device, is automatically closed and locked.

In some situations a coin receptacle may be configured such that manual intervention is required 35 in order to open and/or unlock the receptacle once it is closed or locked. This type of receptacle presents the potential for installing a closed or locked receptacle into a coin handling device which may result in misdirection of counted coins, e.g. onto the floor or the interior of the coin counting device. Accordingly, there is a need for a receptacle configured to automatically unlock and/or open upon insertion into a coin handling device.

In some previous devices, if the cover was closed and locked, it could not thereafter be reopened until the entire lid of the bin was opened, permitting access to the resetting or cocking mechanism of the lock. Accordingly, there was a risk that, owing to personnel forgetfulness, bins could be delivered to coin 35 handling machines in a locked condition and in which the bins could not be unlocked without returning to the central coin processing facility which typically is the only facility able to access the interior of the bin.

5        Certain coin handling devices are configured to define a specific volume for receiving a coin receptacle. When coin receptacles are configured to use a portion of the interior volume of the receptacle for accommodating closing or locking mechanisms, the volume available for holding coins is accordingly reduced, effectively increasing the frequency with which the coin handling device must be serviced, e.g. for removal of counted coins. Accordingly, it would be useful to provide a coin receptacle which reduces or minimizes the volume devoted to closing or locking mechanisms.

10      In a typical coin receptacle, coins entering the receptacle are free to rebound off interior receptacle walls or other coins, creating the potential for damaging or jamming any moving parts placed in or exposed to the interior of the receptacle. Accordingly, it would be useful to provide a coin receptacle which minimizes or reduces the moving parts exposed to the interior of the receptacle.

15      Since coins are relatively dense, a fully-loaded coin bin can have a relatively large mass such as around 500 lbs. (about 200 kg) or more. As the coin receptacles are moved, often using wheels, there is a potential, particularly when receptacles are moved through public areas, for personnel to lose control of the receptacle, potentially causing injury or damage. Accordingly, it would be useful to provide a receptacle which includes one or more wheels for ease of handling but which reduces or eliminates potential for loss of control.

20      In general, then, it would be useful to provide a coin receptacle which is automatically locked and closed on removal from the coin handling device, automatically opened and unlocked on insertion into the coin handling device, provides for efficient use of volume to permit storage of a large number of coins, and minimizes or reduces potential for jamming or damage of mechanisms. Preferably, such a device is robust, relatively inexpensive to manufacture, install and maintain, such as by using a relatively small number of parts, and in general facilitates removal of coins from the coin handling device in a secure, safe, and inexpensive manner, requiring little attention from service personnel and reducing the potential for loss of coins.

## 25      SUMMARY OF THE INVENTION

According to the present invention, the coin receptacle is configured with an opening (through which coins are placed in the receptacle) which is automatically closed and/or locked when the receptacle is removed from the coin handling device and is automatically opened and/or unlocked when the receptacle is inserted into the coin handling device. In one embodiment, a key is mounted in the coin handling device in a position such that, upon insertion of the coin receptacle, the key enters a keyway of the coin receptacle, automatically unlocking and opening a cover which is positioned over the opening of the receptacle. In one embodiment the key and the cover move in a parallel, preferably coplanar fashion through a channel defined by channel rails. The cover includes arms with teeth that engage recesses in the channel for locking the cover in the closed position. The key preferably includes camming surfaces positioned to withdraw the key from the recesses and surfaces to engage the arms of the hatch cover such that, as insertion of the bin causes the key to move through the channel, the key, in turn, causes the cover to move through the channel, uncovering the opening of the bin.

Upon withdrawal of the bin, the key moves through the channel in the opposite direction, drawing the cover through the channel to the closed position and, upon disengagement of the key from the arms of the hatch cover, allowing the arms to resiliently move the teeth back into the channel recesses for locking. Preferably, the mechanism is mounted substantially on an exterior surface of the bin, avoiding undesirable encroachment on the interior volume of the bin and avoiding exposure of moving parts to rebounding coins.

#### BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a perspective view of a coin handling device with doors that are in an open position and coin bins removed;

10 Fig. 2 is an exploded perspective view of a key and lock mechanism according to an embodiment of the present invention;

Fig. 3 is a partially exploded perspective view of the mechanism of Fig. 2 as the key is being first inserted;

Fig. 4 is a perspective view corresponding to that of Fig. 3 but showing the key in a partially inserted position;

15 Fig. 5 is a top plan view of the lock and key mechanism depicted in Fig. 4;

Fig. 6 is a top plan view corresponding to the view of Fig. 5 showing the key further inserted;

Fig. 7 is a top plan view corresponding to that of Fig. 6 but showing the key fully inserted and the cover in the open position.

#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

20 Fig. 1 depicts a coin counting device of a type useful in connection with the present invention with doors in an open position to show interior portions thereof. The present invention can be used in connection with a number of coin handling devices, including those described in U.S. patent 5,564,546 issued June 6, 1994, and PCT/US95/05356 filed May 1, 1995, for Coin Counter/Sorter and Coupon/Voucher Dispensing Machine and Method, both incorporated herein by reference.

25 In the coin counting device of Fig. 1, the lower portion 12 defines a region for receiving first and second coin receptacles such as bins 14a, 14b. First and second keys 16a, 16b are mounted for insertion into keyways of the bins 14a, 14b as described more fully below. The keys 16a, 16b, in the depicted embodiment, are mounted on flexible, curved arms 18a, 18b preferably made of a metal such as spring steel to permit the keys 16a, 16b a degree of freedom of movement (preferably such as at least four degrees of freedom) to achieve insertion into the keyways of the bins as the bins are inserted into the space 12 despite minor misalignment of the keys 16a, 16b with the keyways. The keys 16a, 16b may be made of a number of materials including plastic, metal, fiberglass, ceramic and the like. Preferably the keys 16a, 16b are made from ABS (abutyl styrene) plastic. Preferably the keys 16a, 16b and bins 14a, 14b are configured so that existing coin counting devices can be readily retrofit to accommodate the keys 16a, 16b and receptacles 14a,

30 14b.

35

Preferably the key, when located in the proper position, is not readily visible in the machine, in order to avoid unauthorized persons being able to deduce the configuration of the key or the operation of the lock from an inspection of the key shape. If desired, the key may be provided with one or more decoy, non-functional shapes to confound attempts to deduce key operation from an inspection of the key.

5 A number of features can be included to assist in achieving proper insertion of the keys 16a, 16b to the keyways therein. Preferably, the leading edges of the keys 16a, 16b are chamfered or beveled. The opening of the keyway is preferably provided with angled guides or chamfers 22, 204a,b. Wheel guides 24a, 24b preferably with angled leading edges guide, e.g., the outboard wheels of the bins 14a, 14b to properly position the bins within the space 12.

10 As seen in Fig. 1, the interior surface of the lid of the bin 26 is substantially flat, except the ends of bolts, rivets or other fasteners 28 and the opening 32, thus avoiding undesirable incursion into the interior volume of the bin 14b. Further, as seen in Fig. 1, the interior of the bin 14b is not exposed to any moving parts other than the sliding door or covering of the opening 32. Although, for clarity, Fig. 1 shows the second bin 14b in the open configuration with the lid 26 upright, it is contemplated that normally, the lid 15 26 would not be opened in the vicinity of the coin counting device but would typically only be opened at a central coin processing facility, bank or the like.

20 Bins 14a, 14b include a number of features to facilitate safe transportation of the bins even when fully loaded. The bins are provided with rear wheels 34a,b but the front edges are supported by stop feet 36 a-d which are preferably made of or covered with a non-marking and/or non-staining material. In this way, the bins may be easily moved by slightly tipping backwards 38, e.g. through engaging the socket 42 of a hand truck 44 with a ball hitch 46 mounted on the bin 14b so that the stop feet 36c, 36d are raised above the support surface, permitting the bin 14b to be moved via wheels 34 and the hand truck wheels 48a,b. However, when hand truck 44 is released (permitting the stop feet 36c, 36d to contact the support surface), 25 stop feet 36c, 36d provide a braking effect. In this way, if there is danger of the bin 14b going out of control, the operator may merely release the hand truck 44 causing the feet 36c, 36d to fall to the ground and brake movement of the bin 14b.

30 In the depicted embodiment, the bins are also provided with eyes 52a-d, e.g. for lifting the bins via a crane, boom or the like. When the lid 26 is in the closed position, as shown for bin 14a, the lid is locked, e.g. using a conventional hasp and lock device 54. To facilitate unloading of coins from the bins, an unloading opening 58 is provided in a lower portion of a wall of the bin such as the front wall. Preferably, the lower surface of the bin 62 slopes toward this opening to provide gravity feed. When the bin is not being unloaded, the opening 46 is closed by a plate-like gate 66 held in position, e.g. by an internal rail system (not shown). Preferably the gate 66 is in a contrasting color (compared to the exterior of the bin) to alert operators when the gate 66 is covering the opening 46 and avoid a situation in which a 35 bin is installed in a coin handling machine without the covering 66 in place. The bins 14a, 14b may be provided with reflective and/or contrasting patches 68, e.g. to avoid collisions or other accidents, particularly in nighttime or dark conditions.

In the depicted embodiment the bins are provided with a pocket 72 or other receptacle for holding written or printed information identifying the bin and/or its contents or history. It is also possible to provide an embodiment in which information regarding the bin, its contents or history is stored electronically. A bin can be provided with electronically, optically or machine-readable indicia which uniquely identify the bin. In one embodiment, information about the bin (such as the date and time it is docked or undocked, the identity of the machine with which it is docked, the number of coins and/or value placed into the bins, the times it is emptied, locked, unlocked, the identification number or other identifier of persons accessing the bin, and the like) is sent to a central facility, e.g. over a telephone line, using a modem coupled to the computer or other control device 1874 for storage at a central location, such as a central computer. In another embodiment, information can be electronically stored on a chip or other electronic storage device, preferably battery-powered, which resides on or is coupled to the bin, for recording or storing information about the identity, condition, history or contents of the bin such as information regarding how full the bin is, which location or coin handling device it was connected with in the past, dates and times of docking and undocking, and other information for providing an electronic audit trail and/or accomplishing or facilitating electronic deposit and reconciliation of accounts. In one embodiment, a communications link, such as a wire or a wireless link (e.g. an infrared link) is provided for transferring information from the coin-handling device (such as the identity of the coin-handling device, times, numbers or value of coins placed in the bins or the like) to the bins, e.g. for storage.

As shown in Fig. 2, the cover and locking mechanism and corresponding key 200 include left and right channel rails 202a,b having chamfered leading edges 204a,b and with first and second detents 206a,b formed therein. The rails 202a,b are positioned apart a distance 208 sufficient to accommodate the body portion 210 of a cover 212. The cover 212 includes first and second arms 214a,b. The terminal portions of the arms 214a, 214b define first and second teeth 216a,b, cam followers 218a,b and shoulders 222a,b for purposes to be described below. The key 16 includes first and second cams 226a, 226b configured to engage the cam followers 218a, 218b and first and second recesses 228a, 228b, configured to engage the first and second shoulders 222a, 222b in a manner to be described more fully below. The key 16 has a width 232 such that the key may slide between the channel rails 202a, 202b. A slot 234 is provided on a leading edge at the sides in position to receive a stop pin 236. The rails 202a, 202b and the cover 212 can be formed of a number of materials including plastic, metal, fiberglass, ceramic and the like. Opaque material is desirable for the cover 212 to make the locking mechanism non-visible from the outside of the closed container.

Preferably a cover plate 242 is positioned over the lock and key mechanism 200 to protect the mechanism from dirt, damage or tampering. Preferably the channel cover 242 is formed of an opaque material to conceal the configuration and operation of the lock and key mechanism. In one embodiment, cover 242 is made of a metal such as steel. The cover 242 includes an opening 244 aligned with the opening 32 in the lid 26 for permitting passage of coins therethrough.

In use, an empty or partially empty bin 14a is moved into the space 12, e.g. using the hand truck 44, with the wheel guide 24a forcing the bin 14a into a position such that the key 16a mounted in the space 12 is aligned with the keyway defined between the rails 202a, 202b. Any minor misalignment is accommodated by the chamfered or beveled edges of the key 16a, the resilient spring-like mounting arm 18a, 18b. The keys 16a, 16b are guided into the keyways, as the bins are positioned in the space 12, by the angled surfaces 22, 204a, 204b, as seen, e.g., in Fig. 3. As shown in Fig. 3, prior to insertion of the key 16, the body portion of the cover 212 is positioned over the opening 32 in the lid 26 of the bin. The arms 214a, 214b of the cover are constructed so as to be normally resiliently urged outward toward the rails 302, 303 so that the teeth 216a, 216b engage the edges of the detents 206a, 206b respectively in the rails preventing motion of cover 212 in an opening or first direction 304. The stop pin 236 abuts an edge of the cover 212 to prevent movement of the cover in a second, opposite direction 306.

As depicted in Fig. 4, upon further insertion of the key 16, the camming surfaces of the key contact the cam follower surfaces of the arms 218a, 218b. As shown in Fig. 5, further insertion of the key 16 in the opening direction 304 will create an inwardly-deflecting force 502a, 502b on the arms 214a, 214b causing the ends of the arms to move toward the configuration depicted in Fig. 6 in which the teeth 216a, 216b have cleared the detents 206a, 206b. Preferably, as shown in Fig. 6, the thus-deflected arms are thereby positioned so that the shoulders 206a,b are aligned for engagement with the recesses 228a, 228b respectively and/or the opening 602a, 602b of the arms 214a, 214b are engaged with the pockets 504a, 504b formed at the end of the camming surface of the key 16. In this manner, the key 16 and cover 212 will move substantially together through the channel since relative motion of the cover 12 with respect to the key 16. Therefore, as the key 16 is further inserted in the keyway (owing to continued insertion of the bin 14a into the space 12), the cover 212 is forced in the opening direction 304 to the position depicted in Fig. 7, uncovering the opening 32, as desired. Accordingly, when the bin 14a is inserted into the opening 12, the corresponding key 16a is inserted into the keyway of the bin 14a unlocking the cover and causing the cover to move to the open position automatically, i.e., without the need for human manipulation of the cover or lock.

When the bin 14 is withdrawn from the space 12, the process is essentially reversed. Upon withdrawal, the key 16 is withdrawn in the closing direction 306 and eventually the recess 228a, 228b contacts the shoulders 222a, 222b so that further withdrawal of the key 16 pulls the cover 210 through the channel in the closing direction 306. The cover 210 is eventually pulled to the configuration depicted in Fig. 6 whereupon the cover 212 contacts the stop pin 236 preventing further movement of the cover 212 in the closing direction 306. Continued withdrawal of the key 16 from the keyway (owing to continued withdrawal of the bin 14 from the space 12) allows the arms 214a, 214b to resiliently move back into the locking position depicted in Fig. 5 so that the cover is placed in the closed and locked position. Continued withdrawal of the key 16 from the keyway permits the bin 14 to be freely removed from the coin handler with the cover in a closed and locked position.

In light of the above description, a number of advantages of the present invention can be seen. The present invention provides a coin bin which is automatically closed and locked upon withdrawal from a coin handling device and is automatically opened and unlocked on insertion into a coin handling device. The present invention thus avoids unauthorized access to the contents of the bin with use of hands or simple tools (i.e., ordinary household tools such as pliers, screwdrivers, wrenches, and the like). The device is closed upon withdrawal of the bin and thus will not release coins in the event of tipping or upset. The closing and locking functions are provided without substantial incursion on the interior volume of the bin so that little or no volume is lost to achieve these functions. The device can be constructed with a small number of parts to reduce construction design, maintenance and other costs. Because of the capture of the cover by the key, attempts to block the cover from closing as the bin is removed will prevent the bin from being fully withdrawn from the coin handling device. Preferably, the key is permanently mounted (i.e., is non-removable from coin handling device) so that keeping track of keys and matching keys to trolleys or bins is not necessary. The preferred device operates entirely mechanically and requires no electrical parts. The device operates automatically upon insertion of the bin into or withdrawal of the bin from the coin handling device, and no manual operation, no cocking and no resetting are required. The device is sized and configured to be compatible with, and retrofittable in previous coin handling machines with little, preferably minimal or no, reconfiguration expense.

A number of variations and modifications of the present invention can also be used. It is possible to use some facets of the invention without using others. For example, it is possible to provide a device which provides for automatic opening and/or automatic closing without automatic locking or unlocking. Similarly, it is possible to provide a device which achieves automatic locking and/or unlocking without automatic opening or closing. Although the invention has been described in the context of an embodiment in which the interior of the bin defines a single space, it is also possible to use the present invention in connection with a bin or trolley which defines, in its interior space, multiple subspaces such as different spaces for different denominations or for holding coin bags or other containers therein. Although the depicted embodiment shows a bin with a single coin-entry opening, it is possible to use the present invention in connection with a bin having multiple coin-entry openings (e.g. for different denominations). Although the depicted embodiment provides for automatic operation of both insertion and withdrawal of the bin, it is possible to devise a bin which requires some manual manipulation to open the covering before inserting into a coin counting machine or requires some manipulation to close or lock the cover upon withdrawal. Although the depicted embodiment shows a single key system for each bin, it is possible to devise a system which requires insertion of two or more keys for operation. In one embodiment, it is possible to configure the coin handler so that it receives information regarding whether the opening of the bin is covered or uncovered and/or is properly aligned with an output chute (e.g. to avoid misdirecting counted coins). In the depicted device, the key achieves both the locking function and the opening function. However, it is possible to structure a device in which the key achieves one but not both of these functions.

Although it is preferred to provide a fully mechanical system, it is also possible to provide fully or partially electronic locks and keys. Although a particular lock and key configuration has been depicted, other configurations can be used such as positioning the teeth, camming surfaces, shoulders, recesses in different locations on the key and cover. It is possible to reverse the roles of the (male) key and (female) 5 keyway and/or to reverse the relative positions of cams, cam followers, teeth, detents, recesses and the like.

Although the present invention has been described by way of a preferred embodiment and certain variations and modifications, other variations and modifications can also be used, the invention being defined by the following claims.

What is claimed is:

1. A removable coin bin apparatus usable in a coin-handling device, said coin-handling device defining at least a first bin position the apparatus comprising:

a bin having at least a first opening;

5 a cover for said opening, movable from a closed position substantially covering said opening, to an open position, at least partially uncovering said opening to permit items to be placed into the interior of said bin through said opening;

at least a first lock movable from a locking configuration to maintain said cover in said closed position to an unlocked configuration, permitting movement of said cover to said open position;

10 wherein, when said bin is placed in said first bin position, said first lock is automatically placed in said unlocked configuration.

2. A removable coin bin apparatus usable in a coin-handling device, said coin-handling device defining at least a first bin position the apparatus comprising:

a bin having at least a first opening

15 a cover for said opening, movable from a closed position substantially covering said opening, to an open position, at least partially uncovering said opening to permit items to be placed into the interior of said bin through said opening;

wherein when said bin is placed in said first bin position, said cover is automatically moved to said open position.

20 3. A removable coin bin apparatus usable in a coin-handling device, said coin-handling device defining at least a first bin position the apparatus comprising:

a bin having at least a first opening

25 a cover for said opening, movable from a closed position substantially covering said opening, to an open position, at least partially uncovering said opening to permit items to be placed into the interior of said bin through said opening;

at least a first lock movable from a locking configuration to maintain said cover in said closed position to an unlocked configuration, permitting movement of said cover to said open position;

30 wherein when said bin is removed from said first bin position, said lock is automatically placed in said locking configuration.

4. A removable coin bin apparatus usable in a coin-handling device, said coin-handling device defining at least a first bin position the apparatus comprising:

a bin having at least a first opening

35 a cover for said opening, movable from a closed position substantially covering said opening, to an open position, at least partially uncovering said opening to permit items to be placed into the interior of said bin through said opening;

wherein, when said bin is removed from said first bin position, said cover is automatically moved to said covered position.

5. A removable coin bin apparatus usable in a coin-handling device, said coin-handling device defining at least a first bin position the apparatus comprising:

a bin having at least a first opening;

5 a cover for said opening, movable from a closed position substantially covering said opening, to an open position, at least partially uncovering said opening to permit items to be placed into the interior of said bin through said opening;

at least a first lock movable from a locking configuration to maintain said cover in said closed position to an unlocked configuration, permitting movement of said cover to said open position;

10 wherein, when said bin is placed in said first bin position, said first lock is automatically placed in said unlocked configuration and said cover is automatically moved to said open position; and

wherein when said bin is removed from said first bin position, said cover is automatically moved to said covered position and said lock is automatically placed in said locking configuration.

6. A removable coin bin apparatus usable in a coin-handling device, said coin-handling device defining at least a first bin position the apparatus comprising:

15 a bin having at least a first opening

a cover for said opening, movable from a closed position substantially covering said opening, to an open position, at least partially uncovering said opening to permit items to be placed into the interior of said bin through said opening;

20 at least a first lock movable from a locking configuration to maintain said cover in said closed position to an unlocked configuration, permitting movement of said cover to said open position;

a first keyway positioned in said bin;

at least a first key mounted in a first key position with respect to said coin handler such that when said bin is placed in said first bin position, said key is automatically inserted in said keyway.

25 7. Apparatus, as claimed in claim 6, wherein when said key is inserted at least a first distance in said keyway, said lock is moved to said unlocked position.

8. Apparatus, as claimed in claim 6, wherein when said key is inserted at least a first distance in said keyway, said cover moved to said uncovered position.

9. Apparatus, as claimed in claim 6, wherein when said key is at least partially withdrawn from said keyway, said cover is placed in said covering position.

30 10. Apparatus, as claimed in claim 6, wherein when said key is at least partially withdrawn from said keyway, said lock is moved to said locking configuration.

11. Apparatus, as claimed in claim 6, wherein said cover is coupled to at least a first leg having at least a first tooth, said first leg is positioned such that when said cover is moved to said closed position, said first tooth is aligned with a first recess and wherein, when said tooth is aligned with said recess, said first tooth is urged into engagement with said first recess to lock said cover in said closed position.

12. Apparatus, as claimed in claim 11, wherein said cover is further coupled to a second leg having a second tooth, spaced a first distance from said first leg said second leg positioned such that when said cover is moved to said closed position, said second tooth is aligned with a second recess and wherein, when said second tooth is aligned with said second recess, said second tooth is urged into engagement with said second recess.

5 13. Apparatus, as claimed in claim 12, wherein said first distance is sufficiently large that it is infeasible to simultaneously disengage both said first and said second teeth using ordinary hand tools.

14. Apparatus, as claimed in claim 11, wherein said key is configured to disengage at least said first tooth from said first recess, when said key has been inserted at least a minimum distance into said 10 keyway.

15. Apparatus as claimed in claim 11, wherein said urging of said first tooth into engagement with said first recess is caused by the resiliency of said leg, coupled to said cover.

16. Apparatus as claimed in claim 6 wherein at least a first portion of said cover is positioned in a portion of said keyway, when said cover is in said closed position, and wherein when said key is inserted at least a first distance into said keyway, a first portion of said key contacts at least said first portion of said cover and wherein further insertion of said key into said keyway, causes said first portion of said key to push said cover toward said open position.

17. Apparatus, as claimed in claim 6, wherein said cover is coupled to a detent such that, when said cover is in said open position and said key is inserted in said keyway, said detent is engaged with said key wherein withdrawal of said key a first distance along said keyway pulls said cover toward said closed position.

18. Apparatus, as claimed in claim 17, wherein when said cover is moved to said closed configuration, said detent is urged out of engagement with said key, permitting said key to be further withdrawn along said keyway without further moving said cover.

25 19. Apparatus, as claimed in claim 6, wherein said bin is supported on a support surface by at least a first wheel and at least a first foot, such that said bin may be tipped to lift said foot from contact with said support surface for moving said bin using at least said first wheel and wherein contact of said foot with said support surface resists movement of said bin with respect to said support surface.

20. Apparatus, as claimed in claim 19 wherein said foot includes a substantially non-marking 30 high friction substance.

21. Apparatus, as claimed in claim 6 wherein said bin has interior surfaces defining an interior volume of said bin and wherein said cover and lock are positioned to substantially avoid extending into said interior volume.

22. Apparatus, as claimed in claim 6, wherein said bin has interior surfaces defining an 35 interior volume of said bin and wherein substantially no moving parts of said cover, lock or key are exposed to said interior volume.

23. Apparatus, as claimed in claim 6, wherein at least portions of said keyway are chamfered to guide said key into said keyway.

24. Apparatus, as claimed in claim 6, wherein at least portions of said key are chamfered to guide said key into said keyway.

25. Apparatus, as claimed in claim 6, wherein said key is resiliently mounted in said first key position.

5 26. Apparatus, as claimed in claim 6, further comprising at least a first lifting eye coupled to said bin.

27. Apparatus, as claimed in claim 6, further comprising at least a first ball hitch coupled to said bin.

10 28. Apparatus, as claimed in claim 27, wherein said ball hitch is configured for engagement with a hand truck.

29. A self-locking apparatus for a bin, said bin having a top with an opening therein, said apparatus comprising:

a first channel formed in said top of said bin and adjacent said opening, said first channel defining first and second recesses spaced from said opening;

15 a cover plate shaped to move in said channel from a closed position covering said opening to an open position spaced from said opening, said cover plate having first and second spaced-apart legs, having first and second tabs, respectively, positioned to be aligned with said first and second recesses, respectively, when said cover plate is in said closed position, said arms being resilient such that when said tabs are aligned with said recesses, said tabs are urged into said recesses to engage said recesses of said channel and said arms being sufficiently deflectable to permit said arms to deflect so as to disengage said tabs from said recesses, said first and second arms further defining first and second cam follower surfaces, respectively;

25 a key shaped to move in said channel and defining first and second cam surfaces configured to engage said first and second cam follower surfaces of said first and second arms of said cover plate, respectively, wherein when said cover plate is in said closed position, as said key is moved in said channel in a direction toward said cover plate, said cam surfaces of said key engage said first and second cam followers such that, on further movement of said key toward said cam plate, said cams force said cam followers to move in such a fashion as to deflect said resilient first and second arms to disengage said first and second tabs from said first and second recesses, and wherein further movement of said key in a direction toward said cover plate pushes said cover plate toward said open position.

30. A removable coin bin apparatus usable in a coin-handling device, said coin-handling device defining at least a first bin position, the apparatus comprising:

a bin having at least a first opening;

35 a cover for said opening, movable from a closed position substantially covering said opening, to an open position, at least partially uncovering said opening to permit items to be placed into the interior of said bin through said opening;

means for automatically positioning said cover in said open position when said bin is placed in said first bin position.

31. A removable coin bin apparatus usable in a coin-handling device, said coin-handling device defining at least a first bin position, the apparatus comprising:

a bin having at least a first opening;

5 a cover for said opening, movable from a closed position substantially covering said opening, to an open position, at least partially uncovering said opening to permit items to be placed into the interior of said bin through said opening;

means for locking said cover in said closed position; and

means for automatically unlocking said cover when said bin is placed in said first bin position, permitting movement of said cover to said open position.

10 32. A removable coin bin apparatus usable in a coin-handling device, said coin-handling device defining at least a first bin position, the apparatus comprising:

a bin having at least a first opening;

15 a cover for said opening, movable from a closed position substantially covering said opening, to an open position, at least partially uncovering said opening to permit items to be placed into the interior of said bin through said opening;

means for automatically moving said cover to said closed position when said bin is removed from said bin position.

33. A removable coin bin apparatus usable in a coin-handling device, said coin-handling device defining at least a first bin position, the apparatus comprising:

20 a bin having at least a first opening;

a cover for said opening, movable from a closed position substantially covering said opening, to an open position, at least partially uncovering said opening to permit items to be placed into the interior of said bin through said opening;

25 means for automatically locking said cover in said closed position when said bin is removed from said bin position.

34. Coin handling apparatus, comprising:

a frame;

30 a coin discriminator, coupled to said frame, configured to receive a plurality of coins, determine the value of said plurality of coins, and output said plurality of coins to at least a first output chute;

a bin having at least a first opening, said bin configured to fit in a first bin position wherein said first opening is substantially aligned with said first output chute;

35 a cover for said opening, movable from a closed position substantially covering said opening, to an open position, at least partially uncovering said opening to permit items to be placed into the interior of said bin through said opening;

at least a first lock movable from a locking configuration to maintain said cover in said closed position to an unlocked configuration, permitting movement of said cover to said open position;

wherein when said bin is removed from said first bin position, said lock is automatically placed in said locking configuration.

35. Apparatus, as claimed in claim 34, further comprising at least a first guide means, coupled to said frame, for guiding said bin to said first bin position.

36. Coin handling apparatus, comprising:

a frame;

5 a coin discriminator means, coupled to said frame, for receiving a plurality of coins, determining the value of said plurality of coins, and outputting said plurality of coins to at least a first output chute;

a bin having at least a first opening, said bin configured to fit in a first bin position wherein said first opening is substantially aligned with said first output chute;

10 a cover for said opening, movable from a closed position substantially covering said opening, to an open position, at least partially uncovering said opening to permit items to be placed into the interior of said bin through said opening; and

means for automatically locking said cover in said closed position when said bin is removed from said bin position.

15 37. A method for providing security for coins in a coin bin, for use with a coin discriminating machine, said machine defining at least a first bin position for receiving said coin bin, the method comprising the steps of:

providing a coin bin having a top with an opening covered by a movable cover plate;

mounting a key in a predetermined position with respect to said bin position;

20 inserting said coin bin in said bin position, wherein said key is substantially simultaneously inserted in a keyway formed in said coin bin;

engaging at least a portion of said key with said cover plate; moving said cover plate, in response to further movement of said key in said keyway, to at least partially uncover said opening;

25 withdrawing said bin from said bin position, wherein said key is substantially simultaneously withdrawn from said keyway and wherein said cover plate is substantially simultaneously moved to a position substantially covering said opening; and

automatically locking said plate in said position substantially covering said opening.

38. A method, as claimed in claim 37, further comprising inserting said coin bin in a bin position of a coin handling device, following said step of automatically locking said plate, wherein said plate is automatically unlocked and moved to the open position without the need for manually resetting.

30 39. A bin for use with a coin handling machine, said bin having an opening adjacent a lower portion thereof for removal of coins, with a plate configured to removably cover said opening with means for visually signaling on the exterior of said bin whether said plate is in place, covering said opening.

40. A bin as claimed in claim 39 wherein said means for visually signaling includes providing a visible portion of said cover with a color contrasting that of surrounding portions of said bin exterior surface.

35 41. A removable coin bin apparatus usable in a coin-handling device, said coin-handling device defining at least a first bin position the apparatus comprising:

a bin having at least a first opening, configured to fit in said first bin position;

an electronic information storage device coupled to said bin.

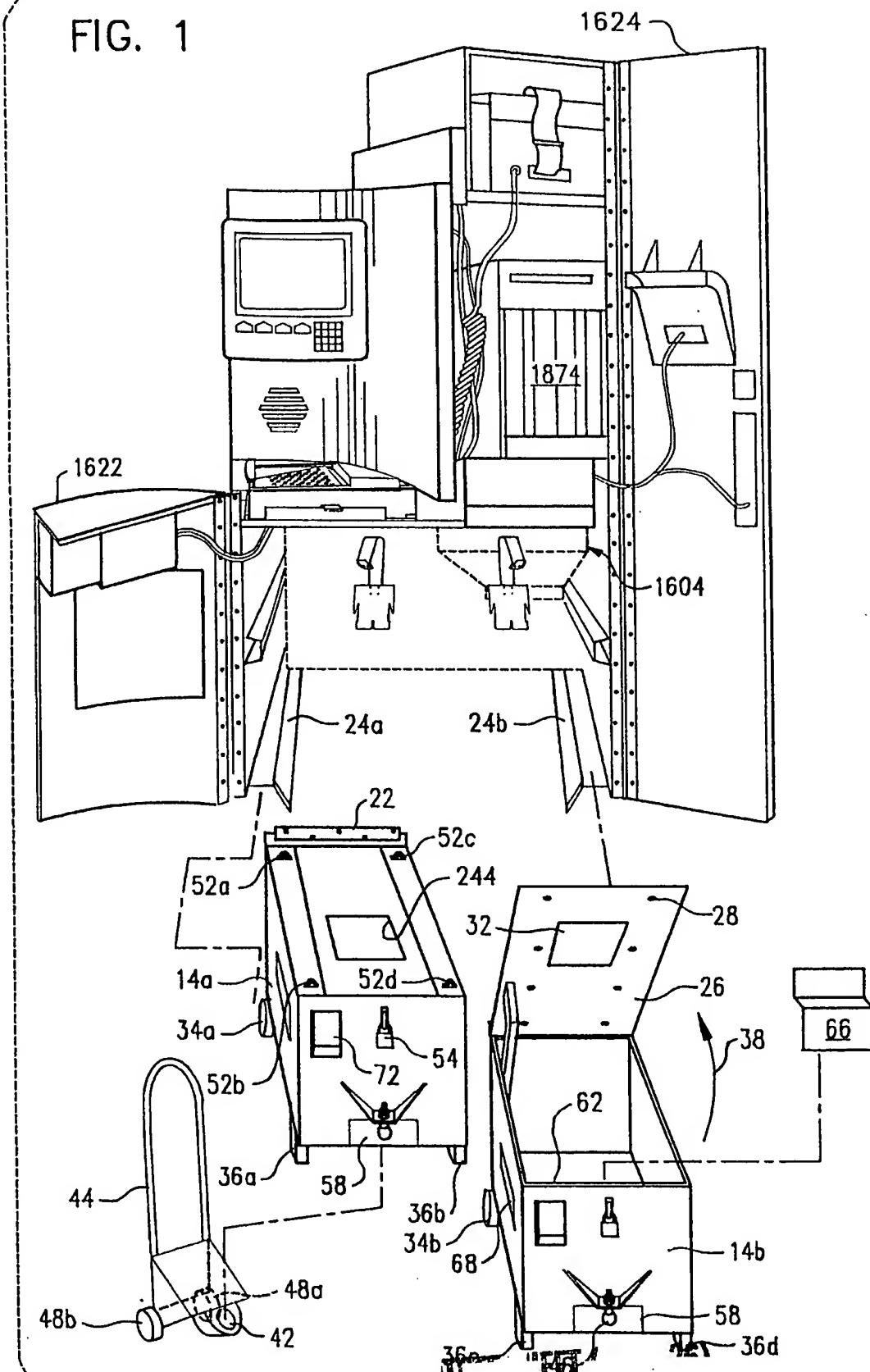
42. A removable coin bin apparatus, as claimed in claim 41, wherein said electronic information storage device is configured to automatically store information selected from the group consisting of a docking time, an undocking time, an identifier of said coin-handling device, a number of coins and a value of bin contents.

5 43. A removable coin bin apparatus, wherein said electronic information storage device is battery-powered.

44. A removable coin bin apparatus, further comprising a communications channel configured to transfer information from said coin-handling device to said bin for storage in said information storage device.

1/6

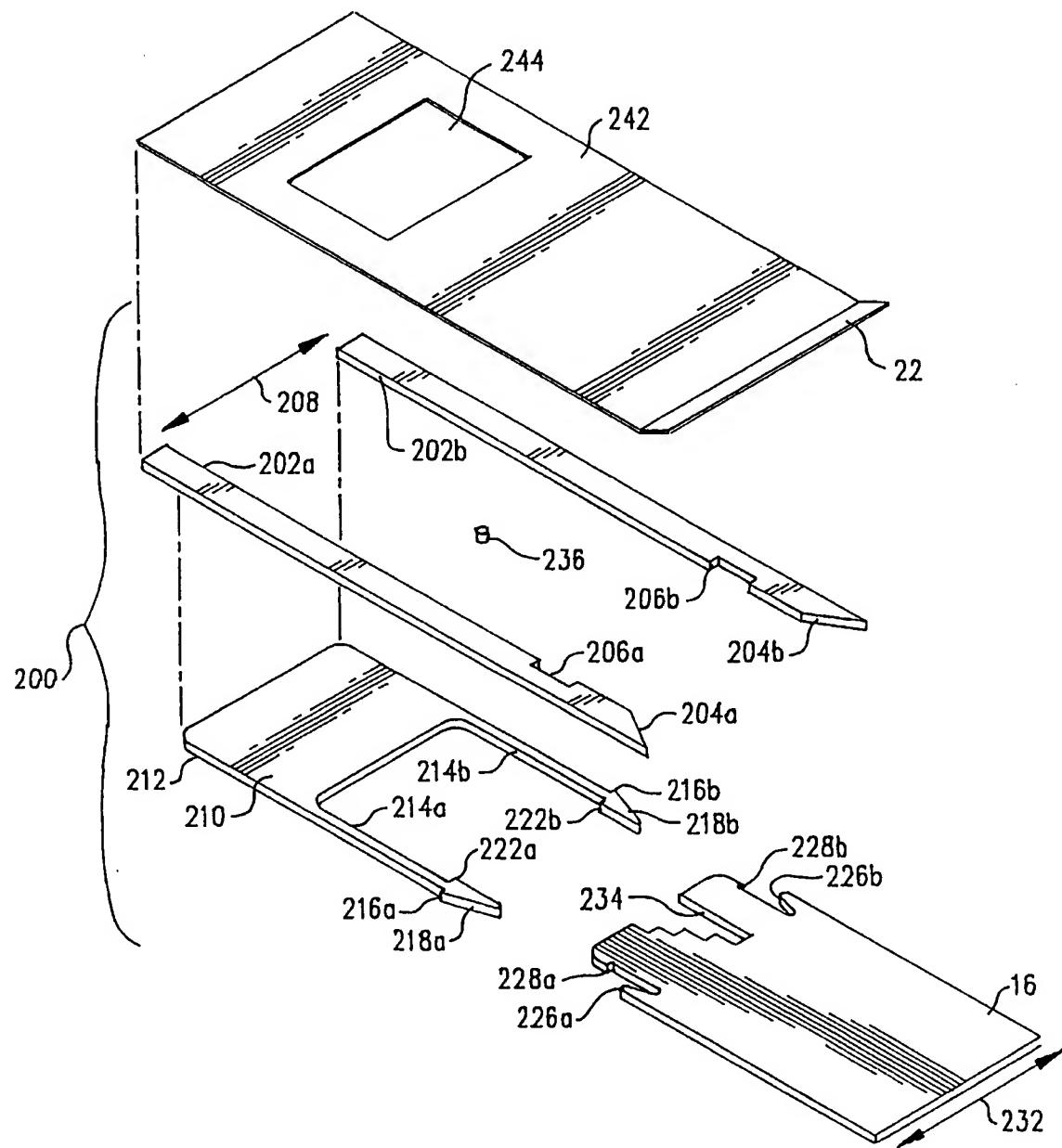
FIG. 1



SUBSTITUTE SHEET ( rule 26 )

2/6

FIG. 2



SUBSTITUTE SHEET ( rule 26 )

3/6

FIG. 3

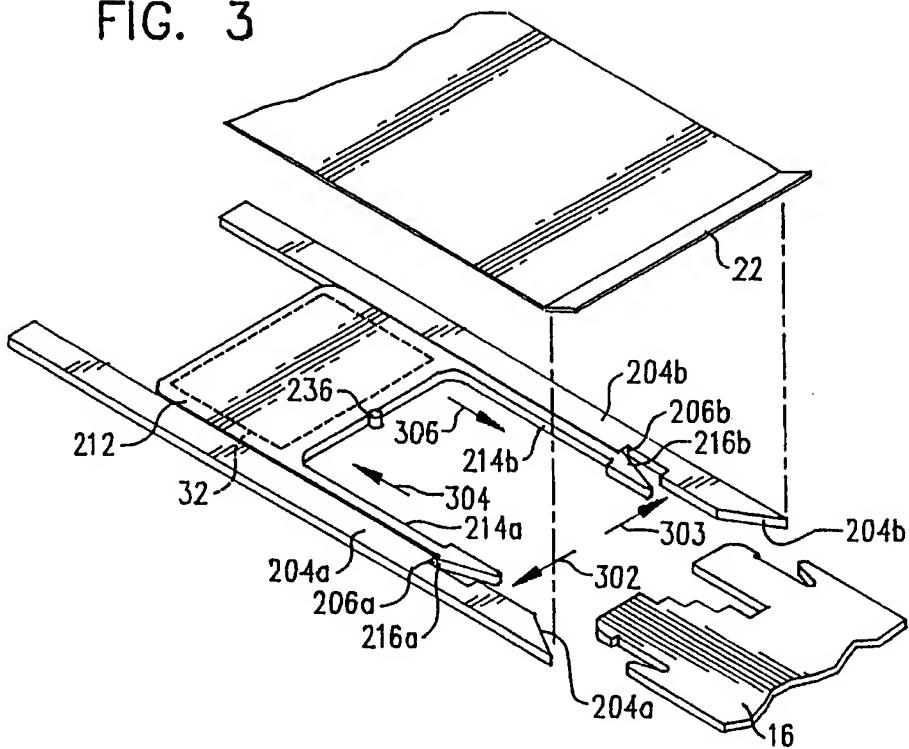
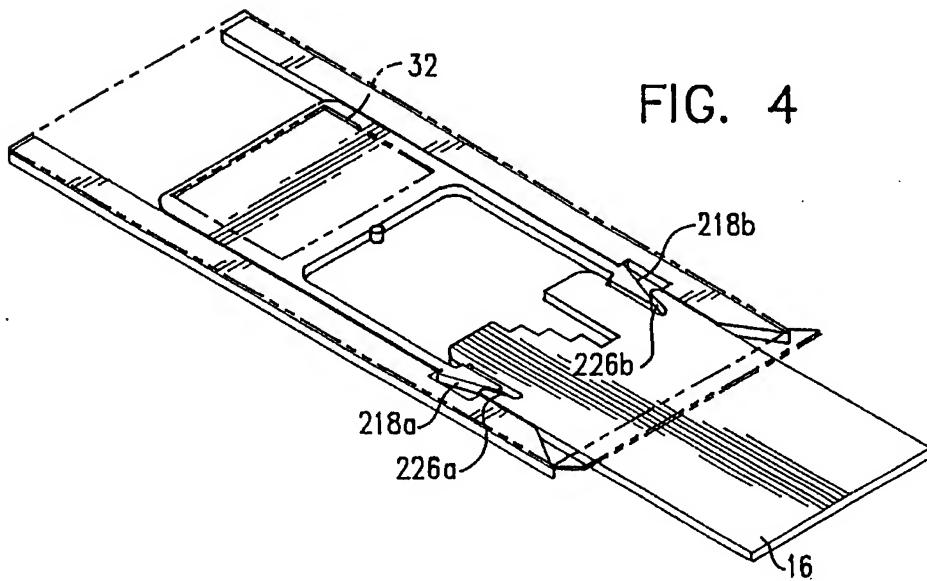


FIG. 4



**SUBSTITUTE SHEET ( rule 26 )**

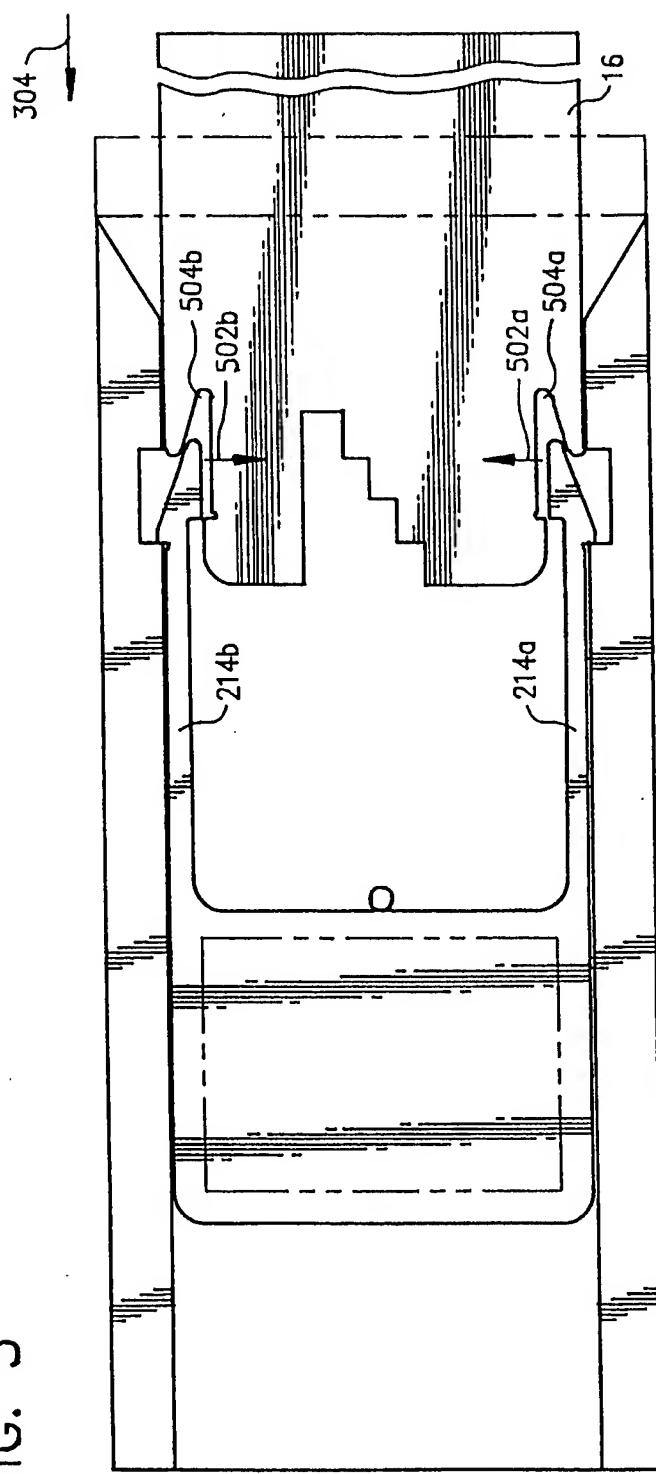
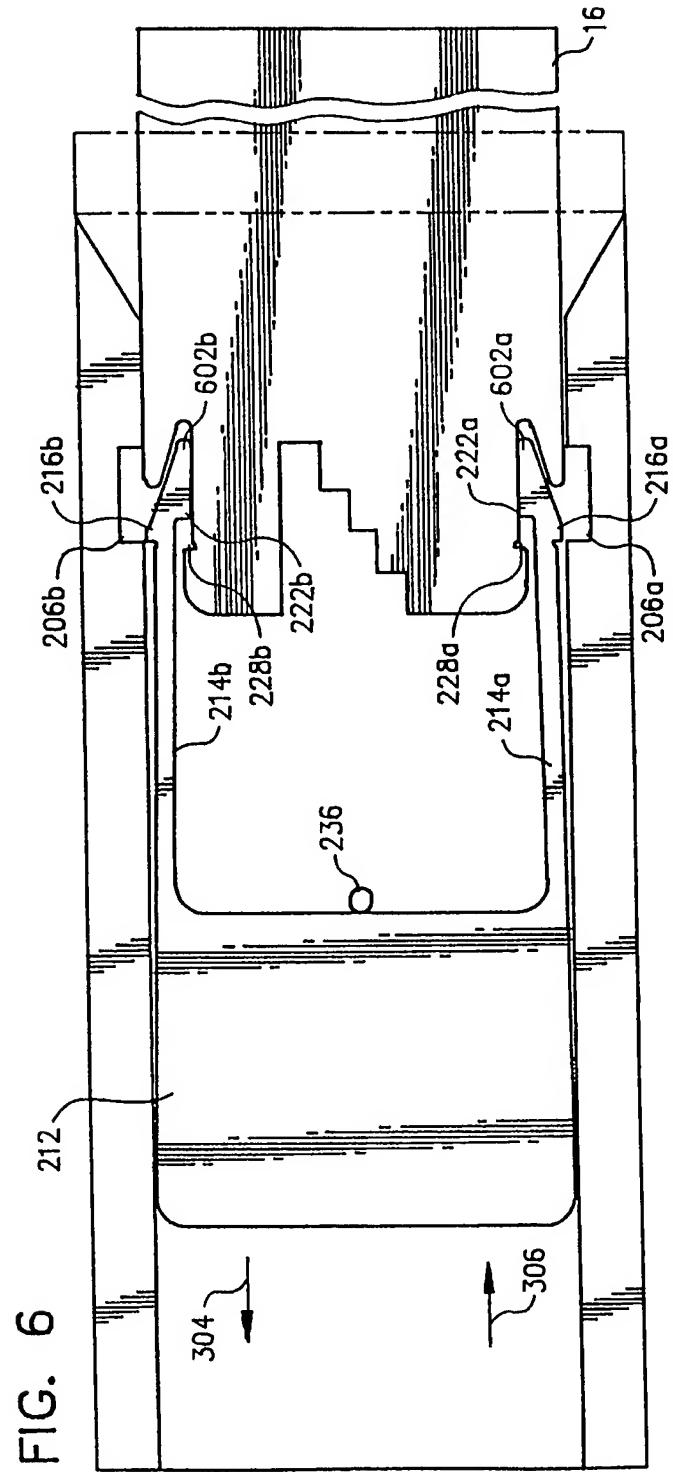


FIG. 5

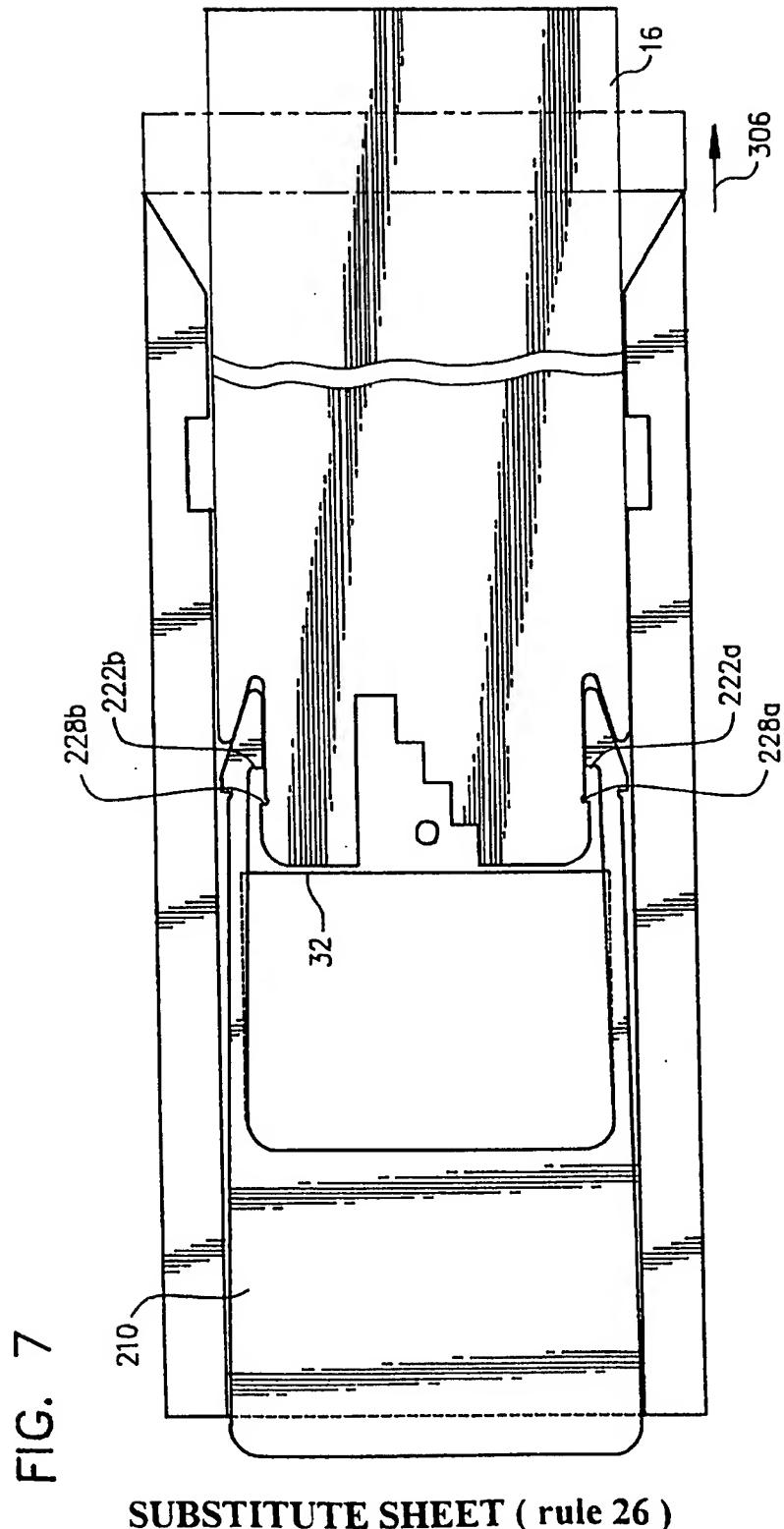
**SUBSTITUTE SHEET ( rule 26 )**

5/6



SUBSTITUTE SHEET ( rule 26 )

6 / 6



## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US98/13297

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) :G07F 9/06

US CL :194/350

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 194/350; 232/ 007, 012, 015, 016; 70/057.1, 387

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 382,867 A (CLASPY) 15 May 1888 (15.05.88) page 1, lines 77-100.	1-10,21-28,30- 33,37,38
		11-15,19,20,34-36
X	US 379,811 A (REIMANN) 20 MARCH 1888 (20.03.88) page 1, line 75 to page 2, line 41.	16
X	US 4,380,316 A (GLINKA et al) 19 APRIL 1983 (19.04.83) col. 3, lines 10-20.	39,40
X	US 5,619,932 A (EFLAND et al) 15 APRIL 1997 (15.04.97) col. 5, lines 28-46.	41-44

Further documents are listed in the continuation of Box C.  See patent family annex.

* Special categories of cited documents:	*T*	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
*A* document defining the general state of the art which is not considered to be of particular relevance		
*E* earlier document published on or after the international filing date	*X*	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
*L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	*Y*	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
*O* document referring to an oral disclosure, use, exhibition or other means	*&*	document member of the same patent family
*P* document published prior to the international filing date but later than the priority date claimed		

Date of the actual completion of the international search	Date of mailing of the international search report
03 SEPTEMBER 1998	19 OCT 1998

Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703) 305-3230	Authorized officer F. J. BARTUSKA <i>Diane Smutek</i> Telephone No. (703) 308-1111
---	--

## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US98/13297

## C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5,390,515 A (ESSICK) 21 FEBRUARY 1995 (21.02.95) col. 5, lines 40-48.	11-15
Y	US 3,066,858 A (TIPTON) 04 DECEMBER 1962 (04.12.62) col. 2, lines 24-34.	19,20
Y	US 5,097,934 A (QUINLAN) 24 MARCH 1992 (24.03.92) col. 3, lines 3-44.	34-36